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| CESO<br><br>Engineer Regulation<br>385-1-92 | Department of the Army<br>U.S. Army Corps of Engineers<br>Washington, DC 20314-1000 | ER 385-1-92<br><br>1 September 2000 |
| | Safety<br><br>SAFETY AND OCCUPATIONAL<br>HEALTH REQUIREMENTS<br>FOR HAZARDOUS, TOXIC<br>AND RADIOACTIVE WASTE<br>(HTRW) ACTIVITIES | |
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DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
CESO Washington, D.C. 20314

Regulation
No. 385-1-92

1 September 2000

Safety
SAFETY AND OCCUPATIONAL HEALTH REQUIREMENTS FOR HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE (HTRW) ACTIVITIES

1. Purpose. This regulation identifies the safety and occupational health documents and procedures required to be developed and implemented by USACE commands and their contractors responsible for executing HTRW response actions, including investigation, design, construction, and other related activities at HTRW sites. In addition, this regulation defines the systematic execution, review, and approval responsibilities within USACE for the required safety and health documents.

2. Applicability. This regulation applies to HQUSACE, major subordinate commands, districts, laboratories, and field operating activities (to be referred to as USACE Commands) performing or contracting HTRW site work, to include Civil Works projects involving HTRW response actions. This regulation does not include the health and safety requirements concerning ordnance and explosives (OE), chemical warfare materiel (CWM), and chemical agent contaminated media (CACM) activities (see definitions). Requirements for these activities are in ER 385-1-95, Safety and Health Requirements for Ordnance and Explosives Response Actions. Projects with potential for containing both HTRW and OE/CWM/CACM require coordination with both the USACE Ordnance and Explosives Mandatory Center of Expertise (OE MCX) and the Hazardous, Toxic and Radioactive Waste Mandatory Center of Expertise (HTRW MCX). Projects involving soil/media contaminated with explosives, shall be performed per ER 1110-1-8153 (Generally projects involving media with secondary explosive concentrations of less than 10 percent by weight follow the applicable requirements of this ER.).

3. Distribution Statement. Approved for public release, distribution is unlimited.

4. References. See Appendix A.

5. Discussion. The most important consideration throughout all aspects of HTRW activities performed by USACE and its contractors is the safety and health of affected on-site personnel working in contaminated areas (for example, exclusion zone, contamination reduction zone) and potential off-site receptors who may be impacted by the work. Accordingly, detailed safety and health

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criteria, practices, and procedures shall be developed and implemented to provide proper control of and protection against the unique safety, chemical, physical, radiological and/or biological hazards and agents associated with the on-site activities to be performed. The development and implementation of appropriate Safety and Health Programs (SHP) and Site Safety and Health Plans (SSHPs) for HTRW site operations are mandated by the Occupational Safety and Health Administration (OSHA), as published in Title 29 CFR 1910.120 (General Industry) or 29 CFR 1926.65 (Construction Industry). The requirements are applicable to all USACE and contractor personnel engaged in on-site activities associated with DERP (Formerly Used Defense Sites (FUDS), Installation Restoration Program IRP), Base Realignment and Closure (BRAC), Formerly Utilized Sites Remedial Action Program (FUSRAP), Environmental Protection Agency (EPA) Superfund, HTRW response actions under Civil Works, and other HTRW projects.

6. Policy. All USACE Commands shall comply with and specify contractor compliance with OSHA standards, especially 29 CFR 1910.120/29 CFR 1926.65, as well as all other applicable safety and occupational health regulations required by USACE and DA throughout all preliminary assessment, site investigation, design, and remedial action construction phases of HTRW projects. Title 29 CFR 1910.120 and 29 CFR 1926.65 standards are essentially the same; 29 CFR 1910.120 applies to assessment, investigation, engineering and design phases, whereas 29 CFR 1926.65 applies to the actual construction phase of the project. As a minimum, the safety and health documents and procedures required by this regulation shall comply with the regulations and appropriate guidance publications referenced above, and other applicable Federal, state, and local government safety and health requirements.

7. Definitions. See Appendix B.

8. Responsibilities.

a. HQUSACE.

(1) CESO has overall responsibility for the USACE Safety and Occupational Health Program to include HTRW safety and occupational health (SOH) policy, programs, procedures, and oversight. CESO will:

(a) Plan, develop, review and revise USACE-wide HTRW SOH requirements/guidance, including ER's, EM's and EC's. This shall

be done in coordination with CEMP-R, for policy and programmatic HTRW SOH requirements, and CECW-E, the designated USACE HTRW technical criteria developer for technical HTRW SOH requirements.

(b) Provide policy and program guidance and assistance to USACE staff elements and USACE Commands to ensure that established SOH requirements are met during investigation, design, construction and other related activities at HTRW sites.

(c) Coordinate with CEMP-R, CECW-E and with the HTRW MCX and the OE MCX, as applicable, on SOH technical assistance to be provided to the USACE Commands.

(d) Jointly with the HTRW MCX conduct SOH management evaluations of USACE Commands' execution of HTRW program activities. Evaluations shall address the investigation, design, engineering and construction portion of the program.

(e) Serve as USACE focal point for overall SOH regulatory and technical issue resolution within and outside the USACE.

(f) CESO will provide CECW with SOH technical input and guidance for any HTRW concerns.

(g) CESO will review SOH requirements for any HTRW problems encountered in the Civil Works Program.

(2) CEMP-R has responsibility for the overall management and direction of the USACE HTRW program (excluding Civil Works projects) related to the proper implementation and execution of the investigation, design and engineering phases of HTRW projects. As the HTRW program manager, CEMP-R will:

(a) Review USACE-wide SOH requirements/guidance (e.g., ER's, EM's, and EC's) developed by CESO related to the site investigation, design engineering and construction phases of HTRW projects.

(b) Provide management assistance to HQUSACE staff elements and USACE Commands to ensure that established SOH requirements are met during site investigation, design and other engineering related activities at HTRW sites, as needed.

(3) CECW is the USACE manager for Civil Works projects and has responsibility to ensure that SOH criteria and actions related to the execution of such work are conducted properly. CECW-E:

(a) Serves as the USACE HTRW technical criteria developer and has responsibility to ensure safety and occupational health criteria and actions related to the execution of the USACE HTRW program are included in published policy and guidance. This technical criteria includes engineering and design as well as remedial action and construction criteria. CECW-E has delegated proponency to CESO for all HTRW SOH technical documents.

(b) Serves as the USACE HTRW construction manager and has responsibility to ensure safety and health criteria and actions related to the execution of remedial action construction on HTRW sites are conducted properly. Engineer Pamphlet (EP) 415-1-266, Resident Engineer Management Guide (REMG) for Hazardous, Toxic, and Radioactive Waste (HTRW) Projects, provides further details concerning remedial action/construction requirements. CECW-E will:

- In coordination with CESO, provide technical assistance to USACE Commands involved in HTRW construction activities.

- In coordination with CESO, assist in the conduct of HTRW construction program oversight and management evaluations concerning SOH as needed.

- Provide for standardized review, comment and acceptance procedures of HTRW contractor SOH submittals prior to commencement of on-site work.

(4) CEPR serves as the USACE HTRW program contracting manager and has responsibility to provide USACE Commands guidance regarding appropriate contracting actions to include provision for SOH contracting clause language. CEPR will:

(a) Provide contracting policy, program and procedures guidance to USACE Commands to include requirements for incorporation of general and special SOH clauses into HTRW contract actions.

(b) Ensure appropriate Federal Acquisition Regulations (FAR) SOH requirements are identified to USACE Commands for use in HTRW contracting actions.

(c) Periodically review and evaluate USACE Commands

contracting implementation and execution procedures and practices for SOH aspects of HTRW contracts.

b. HTRW MCX.

(1) The USACE HTRW Mandatory Center of Expertise(HTRW MCX), in coordination with CESO, CEMP-R and CECW-E, has primary responsibility for maintaining and providing state-of-the-art technical SOH expertise concerning execution of HTRW projects.

(2) Conducts technical review of safety and health documents indicated for review in Table 2: Technical Roles and Responsibilities of USACE Elements for Key HTRW Project Submittals/Activities for Category B Projects (see reference x, Appendix A.) Key Category B project documents considered for HTRW MCX safety and health review include:

(a) Scopes of Work/Work Plans for Site Inspections, Remedial Investigations/Feasibility Studies (RI/FS), Engineering Evaluation/Cost Analysis (EE/CA), and Remedial Designs; and

(b) concept design submittals (typically 30%) with cost estimates which contain substantially complete Health and Safety Design Analyses, and draft, edited Corps of Engineers Guide Specifications (CEGS) 01351, Safety, Health and Emergency Response (HTRW/UST). Category B project documents can also include any other safety and health related documents selected by the HTRW Design District due to special concerns, unusual hazards or complexity.

(3) Identifies and recommends technical SOH policy and guidance needs, and develops SOH guidance and requirements for engineering, design-related aspects of HTRW site investigation, design, and remedial action construction contract development (solicitation, request for proposal) activities conducted in support of the HTRW programs.

(4) Provides technical assistance and support regarding SOH procedures, practices, and requirements to USACE Commands involved in HTRW site investigation, remedial design and remedial action construction project phases, as requested. This includes EPA Superfund and State-lead technical assistance or PRP-lead assignments.

(5) For projects involving or suspected to involve <u>both</u> HTRW and OE/CWM or chemical agent contaminated media (CACM), the HTRW MCX provides technical expertise concerning the HTRW aspects

of the project in accordance with ER 385-1-95 and ER 1110-1-8153.

c. OE MCX. For projects involving or suspected to involve both HTRW and OE/CWM or chemical agent contaminated media (CACM), the OE MCX provides technical expertise concerning the OE/CWM/CACM aspects of the project in accordance with ER 385-1-95 and ER 1110-1-8153.

d. Major Subordinate Commands. The Major Subordinate Command's SOH office is responsible for performing technical monitoring and providing oversight for all HTRW engineering and construction related safety and health requirements, documents, and activities of its District Commands. The Major Subordinate Command, through the SOH Office, will:

(1) Assure that necessary resources are available at its HTRW Design District(s) and Geographic (i.e., executing/construction) District Command(s) for proper implementation and execution of safety and health responsibilities.

(2) Perform technical monitoring and provide management oversight for safety and health design related documents developed and associated activities conducted by their HTRW Design District Command(s) specified in paragraph 8e.

(3) Coordinate resolution of all technical review comments provided by HTRW MCX and the Geographic District Command to the HTRW Design District. Assure that all safety and health comments are resolved satisfactorily and retain final acceptance authority if there is a conflict.

(4) Perform technical review and management oversight of Geographic District Command activities specified in paragraph 8f.

(5) Conduct annual HTRW SOH management evaluations of the Major Subordinate Command HTRW program assignment execution and implementation.

e. HTRW Design District Commands.

(1) HTRW Design Districts are responsible for developing all appropriate safety and health documents (SSHPs, Health and Safety Design Analysis (HSDA) design criteria, and Safety, Health and Emergency Response specifications) for site investigation and engineering phases of HTRW projects required by USACE and OSHA regulations.

(2) Conduct detailed technical review of all required site investigation, pre-design and design-related safety and health documents for Category A and Category B projects as listed in Tables 1 and 2, reference x, Appendix A.

(3) Ensure that all Category B project documents listed in Table 2, reference x, Appendix A, are provided to the HTRW MCX for their concurrent review and comment.

(4) Ensure that all HTRW design criteria and specifications pertaining to safety and health requirements for remedial action construction activities are coordinated with and reviewed by SOH Office personnel (Industrial Hygienists, Health Physicists and Safety Professionals) at the Geographic District Command that will be administering/executing the remedial action construction contract upon award.

(5) Provide technical assistance, as requested, by the Major Subordinate Command or Geographic District Command SOH office in the review of the construction contractor's SSHP prior to commencement of on-site work, and any variations to the accepted SSHP once construction is underway.

(6) Coordinate with the OE MCX and HTRW MCX for projects where the potential to encounter OE/CWM or chemical agent contaminated media (CACM) exists, and proceed according to ER 385-1-95.

f. Geographic District Command. The Geographic District Command (i.e., the executing/remedial action construction District), <u>through the SOH Office</u>, will:

(1) Review all safety and health design criteria and specifications (see paragraph 8e(4)) provided by HTRW Design District Command prior to advertisement. This review will be performed by qualified personnel (Industrial Hygienists, Health Physicists and Safety Personnel) as applicable, in the local SOH Office.

(2) Assist in the preparation of and be responsible for the review, and acceptance of SSHPs developed for in-house HTRW on-site investigation, design and remedial action construction activities.

(3) Review and recommend for acceptance all required remedial action contractor submittals, including the contractor's

SSHP, prior to commencement of any on-site work. The SSHP shall be reviewed and recommended for acceptance by qualified personnel (Industrial Hygienists, Health Physicists and Safety Personnel) in the SOH Office of the Geographic District Command SOH Office. Technical assistance in the review of the Construction-SSHP may be requested by the SOH Office and obtained from the HTRW Design District Command, or qualified SOH personnel residing in offices other than the SOH Office, such as the local Engineering and Construction organization. Radiation safety support can be obtained from the USACE Radiation Safety Support Team (RSST) if in-house health physics personnel are not available. Support from the RSST is available by contacting the HTRW MCX.

(4) Monitor contractor compliance with the accepted SSHP and technical safety and health contract requirements during project execution via periodic on-site quality assurance spot-checks of site activities by qualified Industrial Hygienists, Health Physicists and Safety Personnel, as applicable, from the SOH Office. Any deviations or changes from the accepted SSHP or construction contract specifications will be reviewed and accepted by SOH Office personnel of the Geographic District Command, and, when requested, with technical assistance and concurrence from the HTRW Design District Command.

(5) Ensure that all USACE personnel involved in on-site activities at HTRW sites (including State-lead, PRP-lead, and EPA Superfund technical assistance oversight activities) are familiar with and comply with (as a minimum) the SSHP prepared for the specific site activities to be conducted and overseen. Ensure that USACE personnel have immediate on-site access to review the SSHP. Ensure, in coordination with other USACE Command functional activities (i.e., construction, engineering, human resources, etc.), that involved USACE personnel have received appropriate training, medical surveillance, and personal protective equipment required by the SSHP, contract specifications, OSHA regulations, and USACE policies.

(6) Coordinate with the OE MCX and HTRW MCX for projects where the potential to encounter OE/CWM or chemical agent contaminated media (CACM) exists, and proceed according to ER 385-1-95.

9. Documents. The following safety and occupational health documents are required for HTRW activities. All Scopes of Work/Scopes of Services for contracted HTRW work shall be developed to require these documents, as appropriate to work phase (i.e., site investigation, pre-design, remedial design,

remedial action construction). All in-house HTRW activities performed by USACE personnel shall also require the following documents, as appropriate to the work phase.

a. Safety and Health Program (SHP). All contractors (A/E and remedial action construction/service contractors) and USACE Commands performing on-site activities at HTRW sites are required by regulation to develop and maintain a written safety and health program in compliance with the requirements of OSHA standard 29 CFR 1910.120(b)/29 CFR 1926.65(b).

b. Site Safety and Health Plan (SSHP).

(1) If, in the course of conducting HTRW site investigation, design, construction, or operations and maintenance activities, USACE personnel and/or their contractors (A/E and remedial construction/service contractors) must perform work in contaminated areas and their activites will cause workers to be exposed to the contaminant being cleaned up, a Site Safety and Health Plan (SSHP) shall be prepared. The plan shall be submitted for review and acceptance by the appropriate USACE SOH staff per paragraph 8 above, prior to the commencement of any on-site activity. The SSHP, as defined in this regulation and required by 29 CFR 1910.120(b)(4)/29 CFR 1926.65(b)(4), shall describe the safety and health procedures, practices, and equipment to be implemented and utilized in order to protect affected personnel from the potential hazards associated with the site-specific tasks to be performed. The level of detail provided in the SSHP shall be tailored to the type of work to be performed and the hazards anticipated. In all cases, however, all topics required by OSHA Standard, 29 CFR 1910.120(b)(4)/29 CFR 1926.65(b)(4), and those elements listed and described in Appendix C of this regulation shall be addressed in the SSHP on a site-specific basis. Where use of a specific element is not applicable to the project, provide a negative declaration to establish that adequate consideration was given the topic, and give a brief justification for its omission or reduced level of detail. (All USACE personnel shall comply with USACE accepted, contractor prepared SSHP’s while on site, if an independent USACE SSHP has not been developed.)

(2) Projects which are anticipated to involve both HTRW and OE/CWM or CACM contamination shall have SSHP's developed per paragraph 9.b(1) above and shall incorporate the additional requirements for OE/CWM/CACM projects specified by ER 385-1-95. Coordination of this SSHP with both the OE MCX and HTRW MCX is required prior to commencement of on-site work.

c. Health and Safety Design Analysis. All designs for remediation of HTRW sites shall include a Health and Safety Design Analysis (HSDA), as a chapter of the project design analysis, which addresses the site-specific/hazard-specific, safety and health considerations and protective measures to be instituted for the tasks/operations to be undertaken during subsequent remedial construction activities at the site. This chapter shall fully describe and justify the safety and health requirements to be specified in the remedial action contract, including the decision logic used in their selection. The HSDA shall address the same detailed safety and health elements described in Appendix C. It's applicability will depend on the complexity of the remediation operations and the type of work. If it is not applicable to the project, the designer shall provide negative declaration and justification for exclusion.

d. Safety, Health and Emergency Response Specifications. All contract specifications for HTRW site remedial actions shall contain a section that delineates minimum safety, health, and emergency response requirements to which the remedial construction/service contractor shall adhere. These specifications shall require the contractor to develop and implement an SSHP. The contract requirements shall be fully developed from the HSDA and shall be described in a specification section entitled "Safety, Health and Emergency Response (HTRW/UST)". These contract requirements shall be developed by using Corps of Engineers Guide Specifications (CEGS) No. 01351. The site-specific, task-specific, and hazard-specific procedures, precautions and equipment determined necessary and described in the HSDA shall be clearly biddable and enforceable contractual requirements within this section of the specifications. The Site Description and Contamination Characterization section of the HSDA shall be incorporated for information into the specification, or as an appendix. As a minimum, the safety and health elements described in Appendix C shall be addressed as applicable to the site. The applicability of each element will depend on the complexity of remediation operations and the type of work. If an element is not applicable to the project, the designer shall provide negative declaration and justification for exclusion.

10. Unanticipated Discovery of Ordnance and Explosives, Chemical Warfare Material, and Chemical Agent Contaminated Media. If, during the course of any HTRW response action (site investigation, removal action, or remediation activity), an unanticipated or unplanned discovery of OE/CWM or chemical agent

contaminated media (CACM) occurs, all work shall cease, personnel shall withdraw from the affected area, and the OE MCX shall be contacted for further information and direction (see ER 385-l-95 for specific details).

11. Acronyms. Acronyms that are used in this ER are described in Appendix D.

FOR THE COMMANDER:

MILTON HUNTER
Major General, USA
Chief of Staff

4 Appendices
APP A - References
APP B - Definitions
APP C - Safety and Health Elements For HTRW Activities
APP D - Acronyms

# APPENDIX A

## References

a. PL 96-510, Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

b. PL 98-212, DOD Appropriation Act, Environmental Restoration.

c. PL 99-190, DOD Appropriation Act, Environmental Restoration.

d. PL 99-499, Superfund Amendments and Reauthorization Act (SARA).

e. 10 CFR 19 - 171, Nuclear Regulatory Commission.

f. 29 CFR 1910, Occupational Safety and Health Administration (OSHA), Occupational Safety and Health Standards.

g. 29 CFR 1910.120, OSHA, Hazardous Waste Site Operations and Emergency Response.

h. 29 CFR 1926, OSHA, Safety and Health Regulations for Construction.

i. 29 CFR 1926.65, OSHA, Hazardous Waste Site Operations and Emergency Response.

j. 29 CFR 1960, OSHA, Federal Employee Safety and Health Programs.

k. 49 CFR Subpart C, Department of Transportation (DOT), Hazardous Materials Regulations.

l. NIOSH/OSHA/USCG/EPA, Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, October 1985.

m. FAR 52.236-13, Accident Prevention.

n. AR 40 series.

o. AR 200-1, Environmental Quality, Environmental Protection and Enhancement.

p. AR 385 series.

q. ER 385 series.

r. ER 1110-1-8153, Ordnance and Explosives Response

s. ER 1110-1-8158, Corps-Wide Centers of Expertise Program

t. ER 1165-2-132, Hazardous, Toxic and Radioactive Waste (HTRW) Guidance for Civil Works Projects

u. EP 415-1-266, Resident Engineer Management Guide (REMG) for Hazardous, Toxic, and Radioactive Waste (HTRW) Projects

v. EM 385-1-1, USACE, Safety and Health Requirements Manual

w. CEMP-RT Memorandum, subject: Environmental Cleanup and Protection Management Plan for Military Programs, dated 17 January 1996

x. CEMP-RT Memorandum, subject: Changes in HTRW Technical Roles and Responsibilities Due to Division Laboratory Closures, dated 24 July 1996

y. CESO-I Memorandum, subject: HTRW Medical Surveillance Program Inclusion and Frequency Criteria, dated 29 September 1999

# APPENDIX B

## Definitions

The following definitions are provided to help users fully understand the various requirements of this regulation. In addition, considering the large number of acronyms used herein, a roster of acronyms has been provided at Appendix D.

a. HTRW Activities. HTRW activities include those activities undertaken for the Environmental Protection Agency's (EPA) Superfund program, the Defense Environmental Restoration Program (DERP), including Formerly Used Defense Sites (FUDS) and Installation Restoration Program sites at active DOD facilities, HTRW actions associated with Civil Works projects, and any other mission or non-mission work performed for others at HTRW sites. Such activities include, but are not limited to, Preliminary Assessments/Site Inspections (PA/SI), Remedial Investigations (RI), Feasibility Studies (FS), Engineering Evaluations/Cost Analyses (EE/CA), RCRA Facility Investigations/Corrective Measures Studies/Corrective Measures Implementations/Closure Plans/Part B Permits, or any other investigations, design activities, or remedial construction at known, suspected, or potential HTRW sites. HTRW site activities shall also include those conducted at "Containerized" HTRW sites such as leaking Polychlorinated Biphenyls (PCB) transformers, leaking or suspected leaking Underground Storage Tanks (USTs), that contain hazardous substance(s), hazardous waste(s), or hazardous material(s) as defined by 29 CFR 1910.120(a)(3)/29 CFR 1926.65(a)(3).

b. Safety and Health Program (SHP). A written safety and health program for employees involved in hazardous waste operations meeting the criteria contained in 29 CFR 1910.120(b)/29 CFR 1926.65(b), and EM 385-1-1. Existing written safety and health programs developed and implemented to meet other Federal, State, or Local government regulations are considered acceptable if they cover or are modified to fully cover the applicable topics in these criteria.

c. Industrial Hygienists. Personnel meeting the Office of Personnel Management Standards for the Industrial Hygiene Series GS-690, with three years experience in HTRW work; personnel Certified by the American Board of Industrial Hygiene with one year experience in HTRW work; and military personnel identified

as being a qualified Industrial Hygienist by the Surgeon General having three years experience in HTRW work. In addition, it is expected that these personnel, by virtue of their education, special studies and training, have acquired competence in the practice of Industrial Hygiene.

d. Health Physicists. Personnel meeting the Office of Personnel Management Standards for the Health Physicist Series GS-1306, with three years experience in HTRW work; personnel Certified by the American Board of Health Physicists with one year experience in HTRW work; and military personnel identified as being a qualified Health Physicist by DA having three years experience in HTRW work. In addition, it is expected that these personnel, by virtue of their education, special studies and training, have acquired competence in the practice of Health Physics.

e. Safety Professionals. Personnel meeting the Office of Personnel Management Standards for a Safety and Occupational Health Specialist/Manager Series GS-018, or Safety Engineer Series GS-803 with three years experience in HTRW work; and personnel certified by the Board of Certified Safety Professionals, or a Registered Professional Engineer, with one year experience in HTRW work. In addition, it is expected that these personnel, by virtue of their education, special studies and training, have acquired competence in the practice of safety and occupational health

f. Site Safety and Health Plan (SSHP). A written plan which describes the site-specific methods by which the contractor or USACE personnel will meet the safety and health requirements of OSHA standards, 29 CFR 1910/29 CFR 1926 (specifically 29 CFR 1910.120/29 CFR 1926.65), EM 385-1-1, and the technical contract specification provision - SAFETY, HEALTH, AND EMERGENCY RESPONSE, if applicable. The SSHP will be considered to satisfy the requirements for a written Accident Prevention Plan (FAR clause 52.236-13/EM 385-1-1) if it incorporates the requirements of EM 385-1-1, Section 01.A, including activity hazard analyses.

g. Ordnance and Explosives. OE denotes anything related to munitions designed to cause damage to personnel or material through explosive force, incendiary action or toxic effects. OE is: bombs and warheads, missiles; artillery, mortar and rocket ammunition, small arms ammunition; antipersonnel and antitank mines; demolition charges; high explosives and propellants; depleted uranium rounds; military chemical warfare materials as defined in definition h. below; and all similar and related items or components, explosive in nature or otherwise designed to cause damage to personnel or material (e.g., fuze, boosters/propellants

or soils/media contaminated with explosives if the concentration is sufficient to be reactive.). See ER 1110-1-8153 for details concerning soils/media contaminated explosives. Unexploded Ordnance (UXO) is an item of explosive ordnance which has failed to function as designed or has been abandoned, discarded or improperly disposed of and is still capable of functioning, causing damage to personnel or material. As indicated in paragraph 1 of this ER, all activities concerning OE issues are covered in ER 385-1-95.

h. Chemical agent. A chemical substance that is intended for use in military operations to kill, seriously injure, or incapacitate a person through its physiological effects. Excluded from consideration are industrial chemicals, riot control agents, chemical herbicides, smoke, and incendiary materiels.

i. Chemical warfare material (CWM). An item configured as a munition containing a chemical substance that is intended to kill, seriously, injury, or incapacitate a person through physiological effects. Also includes V- and G- series nerve agent, H-series series blister agent, and lewisite in other than munition configurations. Due to their prevalence and military unique application, chemical agent identification sets (CAIS) are also considered CWM. CWM does not include: riot control agents, chemical herbicides, smoke and flame producing items, or soil, water, debris or other media contaminated with chemical agent. CWM also falls under the definition of ordnance and explosives (OE) per definition g. above.

j. Chemical Agent Contaminated Media (CACM). Any mixture of detectable concentrations of chemical agent(s) with soil, water, debris, or other solid or liquid media.

k. Competent Person. One who can identify existing and predictable hazards in the working environment or working conditions that are dangerous to personnel and who has authorization to take prompt corrective measures to eliminate them.

l. Qualified Person. One who, by possession of a recognized degree, certificate, or professional standing, or extensive knowledge, training, and experience, has successfully demonstrated his or her ability to solve or resolve problems related to the subject matter, the work, or the project.

# APPENDIX C

## Safety and Health Elements For HTRW Documents (SSHPs/HSDAs)

C-1. Site Description and Contamination Characterization.

a. Describe the site location, topography, approximate size, and the past uses of the site.

b. Compile a complete list of the contaminants found or known to be present in site areas to be impacted by work performed. Compilation of this listing shall be based on results of previous studies; or, if not available, select the likely contaminants based on site history and prior site uses/activities. Include, as applicable, the chemical names, radioisotopes, concentration ranges (and strength of radiation fields and levels of radioactive contamination if appropriate), media in which found, locations on site, and estimated quantities/volumes to be impacted by site work.

C-2. Hazard/Risk Analysis.

a. Identify each task and/or operation to be performed. Identify the safety, chemical, physical, radiological and/or biological hazards of concern presented by each task and/or operation. EM 385-1-1, Section 01.A.10, provides details concerning activity hazard analysis preparation. The tasks and hazard/risk analyses shall be modified as needed to address changing work conditions.

(1) Safety. Evaluate the potential for injury from all site conditions and activities (e.g., excavations, slips, trips and falls, electricity, equipment and machinery etc.). Reference EM 385-1-1.

(2) Chemical. List the chemical hazards that may be encountered during site activities and evaluate the chemical, physical, and toxicological properties of the chemicals. Describe the sources and pathways of employee exposure, and anticipated on-site and off-site exposure levels. Address Federal, state and local regulations or recommended exposure standards. Address employee exposure to hazardous substances bought on site for the execution of site activities.

(3) Physical. Evaluate the potential for injury from

physical agents such as noise, heat and cold stress, vibration, etc. that may be present.

(4) Radiological. Evaluate the risk to human health caused by radioactive materials or ionizing radiation fields in the area where work is to be performed. Consider the presence of radioactive isotopes and the type of ionizing radiation they emit. Describe the sources and pathways of employee internal exposure, and anticipated on and off-site internal and external levels. Address Federal, state and local regulations or recommended exposure standards.

(5) Biological. Evaluate the potential for illness or injury due to biological agents (e.g., poisonous plants, animals, insects, microorganisms).

b. Establish action levels and methods to mitigate the hazards noted above for the situations listed below. Action levels and required actions shall be presented in text and tabular forms.

(1) Implementation of engineering controls and work practices.

(2) Upgrades/downgrades in levels of personal protective equipment.

(3) Work stoppage and/or emergency evacuation of on-site personnel.

(4) Prevention and/or minimization of public exposures to hazards created by site activities.

C-2. Staff Organization, Qualifications, and Responsibilities.

a. Develop an organizational structure that sets forth lines of authority (chain of command), responsibilities, and communication procedures concerning site safety and health, and emergency response. This organizational structure shall cover management, supervisors and employees of the contractor and all subcontractors. It shall include the means for coordinating and controlling work activities of subcontractors and suppliers.

b. For contractor conducted activities, summarize the operational and health and safety responsibilities and the qualifications of each key person identified (for in-house USACE conducted activities the operational and health and safety responsibilities noted in C-3.b. 1-5 below, shall be undertaken by qualified and competent USACE industrial hygienists, health

physicists and safety professionals (see Appendix B for definitions of these terms and qualified and competent persons) at the Design District Command or Geographic District Command performing the work as specified in paragraph 8 of this ER.)

(1) For investigative actions (Preliminary Assessments, Site Investigations, Remedial Investigations, Feasibility Studies, etc.) a Certified Industrial Hygienist (CIH) (certified by the American Board of Industrial Hygiene) with 3 years of experience in hazardous waste site operations shall be designated with overall responsibility for the development, implementation, and oversight of the contractor's Safety and Health Program (SHP) and Site Safety and Health Plan (SSHP). The CIH shall sign and date the plans as appropriate. The CIH signature on the SHP and SSHP is an indication of approval of plan development, implementation and content.

(2) For Remedial Design activities a CIH with 3 years of experience in hazardous waste site operations shall be designated with overall responsibility for the development of the contractor's health and safety design analyses (HSDA) and specification section titled Safety, Health and Emergency Response" developed for the Remedial Action (construction). During this process a systematic safety hazard analysis shall also be performed. If it is determined that significant safety hazards associated with the remediation may be present, the CIH shall utilize a Certified Safety Professional (CSP) (certified by the American Board of Certified Safety Professionals) with 3 years of experience in hazardous waste site operations to assess and recommend requirements to address the identified safety hazards related to cleanup of the contaminants (contaminant specific safety hazards). These hazards may include the handling of hazardous wastes or materials that can present fire/explosion hazards, or chemical treatment processes with inherent safety hazards applicable to that specific remedial design. The CIH shall utilize a Certified Health Physicist (CHP)(Certified by the American Board of Health Physicists) with 3 years of experience in hazardous waste site cleanup operations to assess and recommend requirements to address the identified ionizing radiation hazards as applicable. If the designated CIH possesses both certifications, CIH and CSP, or CIH and CHP, this shall be considered to meet the requirement opposed to utilizing two persons.

(3) Upon completion of the HSDA and during the development and finalization of the section titled Safety, Health and Emergency Response (SHER) specifications for the Remedial Action (construction), a determination shall be made to designate either a CIH, CHP or CSP to be responsible for the development and

oversight of the Remedial Action contractor's SHP and SSHP. For in-house designs, the decision on which certified safety and health professional to designate shall be based on the specific hazards to be encountered, and the site specific, task specific and hazard specific procedures, precautions and equipment determined necessary in the HSDA and SHER section developed in the Remedial Design. For contractor developed designs, the contractor shall recommend to the USACE which safety and health professional to designate, based on the criteria indicated above, with USACE SOH personnel making the final decision. For example, a site possessing significant health related hazards (chemical exposures) should have a CIH designated with overall responsibility; alternately a site possessing primarily physical safety hazards with low potential for health related exposures should have a CSP designated; a site possessing primarily ionizing radiation hazards with low potential for chemical contaminant or safety hazards should have a CHP designated. The requirement shall be placed in the appropriate contract documents (solicitations, SOW’s, etc.) prior to issuance. The designated safety and health professional (i.e., CIH, CSP or CHP) shall sign and date the plans.

(4) During the Remedial Action Construction phase a CIH, CSP or CHP with 3 years of experience in hazardous waste site operations shall be designated with overall responsibility for the development, implementation, and oversight of the contractor's Safety and Health Program (SHP) and Site Safety and Health Plan (SSHP), based on the Remedial Design findings. The SSHP shall be signed and dated by the designated safety and health professional.

(5) During the development of SHP’s and SSHP’s in the Remedial Action phase the designated CIH, CSP or CHP responsible for the contractor’s plans shall utilize the services of a qualified and competent industrial hygienist for health related hazards and strategies, a qualified and competent safety professional for physical safety hazards and strategies related to the remediation of the contaminants, or a qualified and competent health physicist for ionizing radiation hazards and strategies, depending on the site specific hazards.

(6) A fully trained and experienced Site Safety and Health Officer (SSHO), responsible to the contractor's CIH/CSP/CHP (or the USACE approving authority for in-house activities), may be delegated to implement and continually enforce the safety and health program and site-specific plan elements on site. The SSHO shall have specific training, knowledge, and experience necessary to implement the SSHP and verify compliance with applicable safety and health requirements. The SSHO shall function as the

Radiation Safety Officer (RSO) as defined and qualified in paragraph 06.E.02 of EM 385-1-1 on sites which involve cleanup of radioactive wastes (unless a separate RSO or HP has been designated for the site).

(7) Fully trained and experienced technicians, responsible to the contractor and the Industrial Hygienist, Health Physicist, or Safety Professional (or the USACE approving authority), may be delegated to implement monitoring and calibration of instruments, and assist the SSHO in enforcing the SSHP.

(8) At least two persons currently certified in First Aid/CPR by the American Red Cross or equivalent agency, according to EM 385-1-1, shall be present on site at all times during site operations.

(9) An Occupational Physician certified in occupational medicine by the American Board of Preventive Medicine, or who, by necessary training and experience is board eligible, shall be responsible for determination of medical surveillance protocols, and for review of all examination/test results.

C-3. Training.

a. All personnel performing on-site work activities, wherein they may be exposed to hazards resulting from hazardous waste site operations, shall have completed applicable training in compliance with 29 CFR 1910/29 CFR 1926, 29 CFR 1910.1200 (HAZCOM) and EM 385-1-1. Although OSHA regulations at 29 CFR 1910.120 and 29 CFR 1926.65 permit varying levels of training based on employee responsibility and exposure potential (i.e., 40 hours and three days or 24 hours and one day), it is the policy of USACE to require the training listed below.

b. Prior to performing on-site HTRW activities in contaminated areas (i.e., Contamination Reduction Zone, Exclusion Zone), USACE and contractor personnel shall successfully complete the following:

(1) A minimum of 40 hours of HTRW health and safety instruction off the site,

(2) Three days of actual field experience under the direct supervision of a trained, experienced supervisor, and

(3) Eight hours of refresher training annually.

(4) All on-site supervisors shall complete the above requirements and an additional 8-hour supervisor's course

covering at least the following topics:

(a) The employer's safety and health program,

(b) Personal protective equipment program,

(c) Spill containment program,

(d) Health hazard monitoring procedures and techniques.

c. Additional, site-specific training covering site hazards, procedures, and all contents of the approved SSHP shall be conducted by the SSHO for all on-site employees, including those assigned only to the Support Zone, prior to the commencement of work; for visitors prior to entering the site; and on an ongoing basis.

(1) 10 CFR 20 requires that employees working with radiation receive training to the extent that they can safely perform their jobs. Training shall also comply with applicable OSHA, DOE and Agreement State requirements (which may be more stringent.) Employees shall be instructed in the following:

(a) Site-specific procedures for handling and storing radioactive materials.

(b) Health and safety hazards associated with exposure to the radioactive material that will be cleaned up or otherwise handled and the purpose and function of protective devices and precautions used to minimize exposure.

(c) Elements of the SSHP and company specific procedures intended to provide protection from radiation exposure.

(d) Worker responsibility to report any unsafe acts or procedures which might result in exposure to ionizing radiation.

(e) Appropriate worker response procedures to on-site events and occurrences which may result in worker exposure.

(f) Worker rights and responsibilities with respect to ionizing radiation exposure.

d. Documentation of all safety and health training including names of employees, duration, contents, and dates of training shall be appended to the SSHP.

C-4. Personal Protective Equipment.

a. A written Personal Protective Equipment (PPE) program in accordance with 29 CFR 1910.132, 29 CFR 1910.120(g)(5)/29 CFR 1926.65(g)(5) and the respiratory protection requirements of 29 CFR 1910.134 is required. When working with radioactive material the respiratory protection requirements of 10 CFR 20 must be met.

b. Provide a detailed description of the minimum PPE and specific materials from which the PPE components are constructed for each site-specific task/operation to be performed, based upon the hazard/risk analysis performed above. Levels of protection must be relevant to site-specific conditions, including potential heat stress and associated PPE safety hazards.

c. Provide site-specific procedures to determine PPE program effectiveness and for on-site fit-testing of respirators, proper cleaning, maintenance, inspection, and storage of all PPE.

C-5. Medical Surveillance.

a. All personnel performing on-site work activities wherein they may be exposed to safety, health or radiologic hazards resulting from site operations shall be participants in an ongoing medical surveillance program, meeting the requirements of 29 CFR 1910.120(f)/29 CFR 1926.65(f), ANSI Z-88.2 and 10 CFR 20 (USACE personnel shall follow the requirements prescribed in EP 385-1-40, USACE Occupational Health Program and USACE Policy Memorandum, Subject: HTRW Medical Surveillance Program Inclusion and Frequency Criteria, dated 29 Sep 1999).

b. In consultation with the Occupational Physician, determine the minimum content and frequencies of necessary medical examinations/tests. This determination shall be based upon probable site conditions, potential occupational exposures and required protective equipment.

c. Examinations shall be performed by or under the supervision of a licensed physician, preferably one knowledgeable in occupational medicine. Examination/test results shall be reviewed by the Occupational Physician.

d. Certification of employees' participation in the medical surveillance program shall be appended to the SSHP. This certification shall include the employees name, the date of last examination, and name of reviewing occupational physician.

e. The written opinion from the attending physician required by 29 CFR 1910.120(f)(7)/29 CFR 1926.65(f)(7) shall be made available upon request to the CO or approving authority for any site employee.

f. All personnel medical monitoring records shall be maintained in accordance with 29 CFR 1910.20.

C-6. Radiation Dosimetry

a. All employees working within a radiologically restricted area shall receive appropriate dosimetry monitoring for radiation exposure.

b. Radiation dosimetry shall be evaluated by an individual holding current personnel dosimetry accreditation from the National Voluntary Laboratory Accreditation Program (NVLAP). Electronic dosimetry may be used to assign external dose if approved by the Qualified Health Physics personnel.

c. All employers (contractors and USACE elements) shall document employee exposure to external radiation. In order to do this employers shall review each employee's radiation exposure history as per 10 CFR 20.2104 for compliance with exposure standards prior to allowing the employee access to a restricted area. If the employee has no exposure history, the employee shall provide a signed written statement to that effect.

d. When there exists the possibility of internal radioactive contamination, employers (contractors and USACE elements) shall estimate exposure with a bioassay program. The bioassay program will provide sampling of employee nasal passages, urine and/or feces, or whole body counting, as appropriate to evaluate the suspected radionuclides. Air monitoring will be used to estimate inhalation exposure to suspected radionuclides.

e. Reports of Exposure to Ionizing Radiation will be furnished:

(1) to each employee:

(a) Annually,

(b) upon termination, and

(c) within 30 days of any personal request.

(2) to the Radiation Safety Officer (RSO) as soon as available.

C-7. Exposure Monitoring/Air Sampling Program.

a. Where it has been determined that there may be potential employee exposures to and/or off-site migration of hazardous concentrations of airborne substances, appropriate direct-reading (real-time) air monitoring and time-integrated (time-weighted average (TWA)) air sampling shall be conducted in accordance with applicable regulations (OSHA, EPA, NRC, State). Air monitoring and air sampling must accurately represent concentrations of airborne contaminants encountered on, and leaving, the site. When appropriate, air sampling shall be conducted to identify the radioactive isotopes and corresponding radiation (alpha, beta, gamma) and activities in the workplace atmosphere and at the perimeter of the site.

b. Real-time screening for ionizing radiation and radioactive materials shall be conducted prior to and during on-site activities where ionizing radiation or radioactive materials may be encountered. When possible, determine the radiation (alpha, beta, gamma) and the exposure rate for each source of radiation.

c. Sampling and analytical methods following NIOSH criteria (for on-site personnel), EPA criteria (for site perimeter or off-site locations) good practice as per 10 CFR 20 subparts C and F for airborne radioactive isotope sampling (on-site personnel and site perimeter) shall be appropriately utilized.

d. Industrial hygiene samples taken to monitor personal exposure shall be analyzed by a laboratory accredited by the American Industrial Hygiene Association and successfully participating in the proficiency analytical testing (PAT) program for the chemical contaminants being sampled for.

e. Representative meteorological data shall be evaluated and used as an adjunct in determining site layout, and perimeter and any off-site monitoring locations. Where perimeter monitoring/sampling is not deemed necessary, a suitable justification for its exclusion shall be provided.

f. Noise monitoring shall be conducted as needed, depending on the hazard/risk analysis.

g. All monitoring/sampling results shall be evaluated and appropriate actions implemented based upon "action levels" established pursuant to paragraph 2.

h. All personnel exposure monitoring records shall be maintained in accordance 29 CFR 1910.20.

C-8. Heat/Cold Stress Monitoring.

a. Heat and/or cold stress monitoring protocols shall be specified and implemented, as appropriate.

b. Physiological monitoring protocols and work/rest schedules shall be developed.

c. The NIOSH/OSHA/USCG/EPA "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities" as well as the American Conference of Governmental Industrial Hygienists (ACGIH) "Threshold Limit Values and Biological Exposure Indices" publication, provides protocols for prevention of heat stress. EM 385-1-1, Section 06.J. provides details on the application of these references depending on the type of clothing worn. Heat stress monitoring shall commence at temperatures of 70 degrees Fahrenheit and above. Cold stress monitoring, to help prevent frostbite and hypothermia, shall be conducted following the most current published ACGIH cold stress TLVs - work/warm-up regimens as prescribed in EM 385-1-1, Section 06.J.

C-10. Standard Operating Safety Procedures, Engineering Controls and Work Practices. Address, as appropriate:

a. Site rules/prohibitions (buddy system, eating/drinking/ smoking restrictions, etc.).

b. Work permit requirements (e.g., radioactive work, excavation, hot work, confined space, etc.)

c. Material handling procedures (soils, liquids, radioactive materials).

d. Drum/container handling procedures and precautions (opening, sampling, overpacking).

e. Confined space entry procedures.

f. Hot work, sources of ignition, fire protection/prevention, and electrical safety (ground-fault protection, overhead power line avoidance, etc.).

g. Excavation and trench safety.

h. Guarding of machinery and equipment.

i. Lockout/Tagout.

j. Fall protection.

k. Hazard Communication.

l. Illumination.

m. Sanitation.

n. Engineering controls.

o. Process Safety Management

p. Signs and labels.

C-9. Site Control Measures.

a. Establish work zones and access points. Work zone delineation (Exclusion Zone including restricted and regulated areas, Contamination Reduction Zone, Support Zone) shall be based upon the contamination characterization data and the hazard/risk analysis performed pursuant to paragraphs C-1 and C-2 above.

b. Include a site map delineating the zones established above.

c. On sites where ionizing radiation or radioactive material may be encountered, designate restricted areas (Radiation Areas, High Radiation Areas, and Airborne Radioactive Contamination Areas as defined in 10 CFR 20).

d. Describe on-site and off-site communications.

e. Describe site security (physical and procedural).

f. Describe general site access.

C-10. Personal Hygiene and Decontamination.

a. Specify necessary facilities and their locations.

b. Provide detailed standard operating procedures, frequencies, supplies, and materials to accomplish decontamination of site personnel.

C-11. Equipment Decontamination.

a. Specify necessary facilities, equipment, and their locations.

b. Provide detailed procedures, frequencies, supplies, materials for decontamination, and methods to determine adequacy

of decontamination of equipment used on site. For sites where radioactive contamination is present, include levels of removable and fixed contamination acceptable for release from the exclusion zone.

C-12. Emergency Equipment and First Aid Requirements. The following items, as appropriate, shall be immediately available for on-site use:

a. First aid equipment and supplies approved by the consulting physician.

b. Emergency eyewashes/showers (per ANSI Z-358.1).

c. Emergency-use respirators, (i.e., for escape: 5 - 15 minute emergency escape mask with air bottle; for rescue: positive pressure self-contained breathing apparatus (SCBA)).

d. Spill control materials and equipment.

e. Fire extinguishers (specify type, size, locations).

C-13. Emergency Response and Contingency Procedures (On-Site and Off-site).

a. Local fire/police/rescue authorities having jurisdiction and nearby medical facilities that would be utilized for emergency treatment of injured personnel shall be contacted in order to notify them of upcoming site activities and potential emergency situations, to ascertain their response capabilities, and to obtain a response commitment.

b. An Emergency Response Plan, which complies with 29 CFR 1910.120(l)/29 CFR 1926.65(l), and which, as a minimum, addresses the following elements, shall be developed and implemented:

(1) Pre-emergency planning and procedures for reporting incidents to appropriate government agencies for potential chemical exposures, personal injuries, fires/explosions, environmental spills and releases, discovery of radioactive materials.

(2) Personnel roles, lines of authority, communications.

(3) Posted instructions and list of emergency contacts: physician/nearby medical facility, fire and police departments, ambulance service, Federal/state/local environmental agencies, CIH/CSP/CHP, Contracting Officer, or approving authority for in-house activities.

(4) Emergency recognition and prevention.

(5) Site topography, layout, and prevailing weather conditions.

(6) Criteria and procedures for site evacuation (emergency alerting procedures/employee alarm system, emergency PPE and equipment, safe distances, places of refuge, evacuation routes, site security and control).

(7) Specific procedures for decontamination and medical treatment of injured personnel.

(8) Route maps to nearest pre-notified medical facility.

(9) Criteria for initiating community alert program, contacts and responsibilities.

(10) Critique of emergency responses and follow-up.

c. If all personnel will be evacuated from the site and not allowed to assist in handling the emergency, the emergency response plan listed in Paragraph 15.b. may be replaced by an emergency action plan complying with 29 CFR 1910.38(a).

C-14. Accident Prevention.

a. Any additional Accident Prevention Plan topics required by EM 385-1-1 which are not specifically covered in this appendix, shall be addressed.

b. Daily safety and health inspections shall be conducted to ensure the effectiveness of the SSHP, and determine if operations are being performed in accordance with the SSHP, USACE and OSHA regulations, and contract requirements.

c. In the event of an accident/incident, the CO (or approving authority for in-house USACE activities) shall be notified according to EM 385-1-1. Within two (2) working days of any reportable accident, the contractor (or responsible USACE supervisor for in-house USACE activities) shall complete and submit required Accident Reports. If there is an accident involving radiation the RPO for the USACE Geographic Command or the Radiation Protection Staff Officer (located at HQUSACE, CESO) shall be notified immediately.

C-15. Logs, Reports, and Recordkeeping.

a. The following logs, reports, and records shall be developed, retained, and submitted to the CO (or approving authority for in-house activities):

(1) Training logs (site-specific and visitor), and records of radiological instructions and notices to workers.

(2) Daily safety inspection logs (may be part of the Daily QC Reports).

(3) Equipment maintenance logs.

(4) Employee/visitor register.

(5) Environmental and personal exposure monitoring/ sampling results.

b. For work involving exposure to radiation, the following additional logs, reports and records shall be developed, retained and submitted to the CO (or approving authority for in-house activities):

(1) Records of radiation surveys, monitoring and disposal as per 10 CFR 20 subpart L.

(2) Reports of loss of licensed material as per 10 CFR 20.402.

(3) Notification of Incidents as per 10 CFR 20 subpart M Reports.

(4) Reports of overexposure and excessive levels and concentrations as per 10 CFR 20.405.

(5) Notification and reports to individuals as per 10 CFR 20.409.

# APPENDIX D

## Acronyms

A/E - Architectural/Engineering

ANSI - American National Standards Institute

AR - Army Regulation

CDR - Commander

CACM - Chemical Agent Contaminated Media

CECW - Corps of Engineers Civil Works

CEIM - Corps of Engineers Information Management

CEPR - Corps of Engineers Assistant Principle Responsible for Contracting

CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act

CESO - Corps of Engineers Safety and Occupational Health Office, HQUSACE

CFR - Code of Federal Regulations

CIH - Certified Industrial Hygienist

CHP - Certified Health Physicist

CWM - Chemical Warfare Materiel

CO - Contracting Officer

CPR - CardioPulmonary Resuscitation

CSP - Certified Safety Professional

DA - Department of the Army

DERP - Defense Environmental Restoration Program

DOD - Department of Defense

EC - Engineering Circular

EE/CA - Engineering Evaluation/Cost Analysis

EM - Engineering Manual

EP - Engineering Pamphlet

EPA - Environmental Protection Agency

ER - Engineering Regulation

FAR - Federal Acquisition Regulation

FS - Feasibility Study

FUDS - Formerly Used Defense Site

FUSRAP - Formerly Utilized Sites Remedial Action Program

GS - General Schedule

HQUSACE - Headquarters U. S. Army Corps of Engineers

HSDA - Health and Safety Design Analysis

HTRW - Hazardous, Toxic and Radioactive Waste

MOA - Memorandum of Agreement

MCX - Mandatory Center of Expertise

MSC - Major Subordinate Commands

NIOSH - National Institute for Occupational Safety and Health

NRC - Nuclear Regulatory Commission

OCE - Office of the Chief of Engineers

OE - Ordnance and Explosives

OSHA - Occupational Safety and Health Administration

PA - Preliminary Assessment

PL - Public Law

PPE - Personal Protective Equipment

PRP - Potentially Responsible Party

QA - Quality Assurance

QC - Quality Control

RCRA - Resource Conservation and Recovery Act

RDTE - Research Development Test and Evaluation

RI - Remedial Investigation

RPO - Radiation Protection Officer

RSST - Radiation Safety Support Team

SCBA - Self-Contained Breathing Apparatus

SHP - Safety and Health Program

SI - Site Inspection

SOH - Safety and Occupational Health

SSHO - Site Safety and Health Officer

SSHP - Site Safety and Health Plan

TWA - Time Weighted Average

USACE - U. S. Army Corps of Engineers

USCG - United States Coast Guard

UST - Underground Storage Tank